COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

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BAY STATE GAS COMPANY) D.T.E. 98-86

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INITIAL BRIEF OF BAY STATE GAS COMPANY

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Pursuant to M.G.L. c. 164, Section 69I, on August 12, 1998 Bay State Gas Company ("Bay State" or "the Company"), filed a Long Range Forecast and Supply Plan ("F&SP") for the period 1998-2003. As demonstrated herein, Bay State's F&SP complies with Section 69I and regulations promulgated thereunder (980 C.M.R. 7.00 et seq.) and should be approved by the Department of Telecommunications and Energy ("the Department").

I. PROCEDURAL HISTORY

In approving Bay State's last F&SP, the Department directed the Company to file its next F&SP by April 6, 1998. Bay State Gas Company, D.P.U. 93-129, p. 53 (1996). By letter dated February 27, 1998, Bay State requested a waiver from the requirement that it file its next F&SP and instead proposed that an alternative process for reviewing planning issues be developed in an unbundling docket. On April 3, 1998, the Department opened a generic unbundling inquiry, D.T.E. 98-32, to address issues related to retail competition in the natural gas industry, including issues related to the supply planning process.

In a letter dated April 6, 1998, the Department required Bay State, by April 17, 1998, to either request a two month postponement of its F&SP filing or to propose an alternative mechanism for reviewing planning issues. On April 17, 1998, Bay State notified the Department of its intent to submit an F&SP and requested a postponement until July 15, 1998. The Department approved this request. On June 30, 1998, the Company requested authority to file its F&SP on August 12, 1998, due to the extension in the procedural schedule of the unbundling docket and due to the complexity of the model runs being generated and analyzed by the Company. On July 16, 1998, the Department approved Bay State's request.

On August 12, 1998, Bay State filed a confidential version of its F&SP and a Motion to Replace Required Tables with Bay State Gas Company's Tables. On August 18, 1998, the Company filed a Motion for Protective Treatment of Confidential Information concerning its F&SP filing, and filed redacted versions of its F&SP filing.

The Department issued a Notice of Public Hearing on November 4, 1998 scheduling a public hearing for December 1, 1998. On November 5, 1998, the Department issued an Amended Notice of Public Hearing, scheduling a public hearing for December 2, 1998. A Second Amended Notice of Public Hearing was issued on November 23, 1998, scheduling a public hearing for December 16, 1998.

No members of the public appeared at the public hearing held on December 16, 1998. At the procedural conference immediately following the public hearing, the Department granted intervenor status to the Division of Energy Resources ("DOER") and the Attorney General of the Commonwealth of Massachusetts ("Attorney General").

On December 23, 1998, the Hearing Officer issued an order denying Bay State's Motion for Protective Treatment for Confidential Information except as to supplier price information, and denying Bay State's Motion to Replace Required Tables with Bay State Gas Company's Tables. The Hearing Officer further ordered the Company to file unredacted copies of its filing. On January 8, 1999, Bay State filed the required unredacted copies of its F&SP, which protected only the supplier price information. Also on January 8, 1999, the Hearing Officer allowed Bay State to file tables replacing required tables, and requested supplemental materials which Bay State filed as Response D.T.E.-1-29(a) supplemental.

The Department propounded two sets of information requests, totaling 45 requests to which Bay State responded. No other discovery was propounded by any party.

The Department held an evidentiary hearing on March 9, 1999. At that hearing, the Company presented the sworn testimony of the following Bay State employees: Francisco C. DaFonte, Director of Gas Control; Stanley M. Dziura, Jr., Manager of Energy Demand and Supply Planning; and Christopher A. Kahl, Supply Planning Analyst. The Department issued eight record requests, to which the Company responded. On March 25, 1999, the Department issued one supplemental record request to which the Company responded on April 12, 1999.

II. BAY STATE'S SENDOUT FORECAST IS REVIEWABLE, APPROPRIATE AND RELIABLE, AND THEREFORE SHOULD BE APPROVED BY THE DEPARTMENT

A. Standard of Review

Pursuant to M.G.L. c. 164, § 69I, the Department must approve or reject long-range plans. The Department must review the sendout forecast to ensure that the forecast accurately projects the gas sendout requirements of the utility's market area. Bay State Gas Company, D.P.U. 93-129, p. 4 (1996). The forecast must reflect accurate and complete historical data, as well as reasonable statistical projection methods, which should provide a sound basis for resource planning decisions. Id. at 4-5. (citing 980 C.M.R. 7.02(9)); Colonial Gas Company, D.P.U. 93-13, p. 2 (1995); Boston Gas Company, 25 DOMSC 116, 127 (1992); Berkshire Gas Company, 16 DOMSC 53, 56 (1987).

In reviewing a gas company's sendout forecast, the Department determines whether a projection method is reasonable by assessing whether the methodology is:

(a) reviewable, that is, contains enough information to allow a full understanding of the forecast methodology;

(b) appropriate, that is, technically suitable to the size and nature of the particular gas company; and,

(c) reliable, that is, provides a measure of confidence that the gas company's assumptions, judgments, and data will forecast what is most likely to occur.

Bay State Gas Company, D.P.U. 93-129, p. 5 (1996).

B. Bay State Used the Same Sendout Forecast Methodology and Models as Were Previously Approved by the Department, with Certain Enhancements

1. Overview

Bay State's resource planning process has three major elements: (1) Annual Throughput[(1)] Forecasts; (2) Design and Normal Planning Standards; and, (3) Optimal Resource Plans. Exhibit BSG-1, p. 8. The resource plans provided by this process are a "snapshot" in that they depict projected requirements and resources at a point in time. They are, therefore, subject to change. Exhibit BSG-1, p. 7.

In forecasting throughput, Bay State used the same forecast model that was approved in D.P.U. 93-129, with an additional enhancement to develop the forecast presented herein.[(2)] Specifically, Bay State incorporated time series analysis into the demand forecasting process that the Department previously approved in D.P.U. 93-129. Exhibit BSG-1, pp. 14, 17-19. In order to capture the strengths of both the econometric and the time series models, rather than relying on only one model, the time-series forecasts and the econometric forecast were combined. Tr. 1, p. 31 (Dziura); Exhibit BSG-1, p. 19. Combining forecasts in this manner is common. Tr. 1, pp. 32, 32 (Dziura). The results of combining time series analysis with econometric modeling are shown in Bay State's response to D.T.E.-RR-1.

Bay State accounted for forecasting uncertainty by developing High and Low Throughput Cases to provide a range of outcomes around its Base Case forecast[(3)]

. The Base Case is the most likely projection of total throughput requirements based on service area and customer class-specific econometric and time series models, and projections of economic, demographic and other key drivers over the five-year forecast period. Exhibit BSG-1, p. 11, and Schedules BSG-III-4 and III-5. The High Throughput Case applied more optimistic forecasts of economic and demographic drivers to the same models. Exhibit BSG, p. 11. Additionally, an optimistic forecast of marketing efforts was used, and throughput related to certain large projects likely to come on line was added during the forecast period. Id. at 12, and Schedules BSG-III-4 and III-6; Tr. 1, p. 42 (Dziura). The Low Throughput Case applied more pessimistic forecasts of economic and demographic drivers to the same models used to develop the base case forecast. Exhibit BSG-1, p. 12, and Schedules BSG-III-4 and III-7. In addition, an adjustment was made to reduce load to reflect increased Demand Side Management ("DSM") efforts, which is greater than the impact of DSM that was already reflected in the historical data upon which the Base Case was developed. Exhibit BSG-1, pp. 11-12.

The uncertainty associated with migration of customers from bundled sales service to unbundled transportation service was reflected through the two sensitivity analyses performed by Bay State. A Low Migration Sensitivity Case used the High Throughput Case as a starting point and assumed that there would be no further migration from sales to transportation and that there would be some migration back to sales during the first year of the forecast. A High Migration Sensitivity Case used the Low Throughput Case as a starting point and assumed that 15 percent of all customers would migrate to transportation service each year. Exhibit BSG-1, p. 13. By running its migration sensitivities off the High Case and Low Case, Bay State widened the bandwidth of cases studied. Tr. l, pp. 12-13 (Dziura).

2. <u>Inputs</u>

In developing the demand forecasts and various scenarios presented for review in this proceeding, Bay State used the following historical data from the first quarter of 1983 through the fourth quarter of 1997:

(1) Number of active meters, MMBtu sales, and revenues;

(2) Economic variables which were modeled and forecast by Standard & Poors DRI specifically for each of the Company's service territories[(4)];

(3) Historical Effective Degree Day ("EDD") data (from Weather Services, Inc.); and,

(4) Historical oil price data from DOER.

Exhibit BSG-1, pp. 15-16.

As one of its forecast enhancements, Bay State multiplied the gas prices and EDDs to create a combined variable for determining the residential heating use per meter. The Company did this to capture the interactive effect of the price and degree-day. Tr. 1, p. 110, 111 (Dziura). Each variable could have been included separately, but that would presume that price and degree-day bear no relationship to one another. Id. at 110. Further, doing so would have only a slight change in the parameter estimate for EDDs, and therefore entering the EDDs and the gas price in the equation as separate variables would not have affected the forecast. D.T.E.-RR-8.

Additionally, it is acceptable to use a combined variable even though the signs of the relationships of the underlying variables, i.e. gas price and EDD, to the dependent variable are opposite one another. Tr. 1, p. 101 (Dziura). The combination of one positive sign and one negative sign variable is always negative. This combined variable along with a variable for effective degree days alone has the effect of reducing the influence of effective degree days at higher price levels. Tr. 1, pp. 102, 108 (Dziura).

A gas price multiplied by EDD combined variable is not an unusual variable. Id. at 110 (Dziura). For example, in E.F.S.C. 90-5, Commonwealth Gas Company used several interactive variables in various models, including an interactive variable for the interaction of degree days and gas price. D.T.E.-RR-7.

3. Design Planning Standards

a. Weather Data

Since D.P.U. 93-129, Bay State continues to use a weather database of division-specific EDDs purchased from Weather Services, Inc. In D.P.U. 93-129, the Department suggested that Bay State use a data set representing the largest cost-effective sample size of EDDs beyond the 20 years that the Company then used. In response, Bay State expanded to 31 years, i.e., all EDD data from its database is used in the development of design and normal planning standards. Exhibit BSG-1, p. 30.

b. Design Conditions

Bay State continues to use the 1-in-25 year recurrence standard approved by the Department in D.P.U. 93-129 for design conditions. That is, Bay State plans to meet load projected to occur during the coldest day and the coldest year likely to be experienced over a 25 year period. In D.P.U. 93-129, Bay State presented detailed cost/benefit analyses on system improvements to support the 1 in 25 year standards. Bay State does not expect that the cost/benefit analyses presented in D.P.U. 93-129 concerning use of a stricter standard have changed because the Company has not changed its approach to system improvements since D.P.U. 93-129. Exhibit BSG-1, p. 30; Tr. 1, pp. 17-18 (Dziura). Accordingly, Bay State has not changed its design planning standards.

c. Cold Snap Analysis

In the F&SP presented herein, the cold snap analysis is encompassed in and modeled as part of the design winter weather pattern. The EDDs used in Bay State's design winter pattern are very close to the cold snap conditions used in D.P.U. 93-129, which consisted of two actual 24-day periods. The coldest 24-day period in Bay State's design year is approximately 95 percent of the total EDDs in the coldest actual 24-day period in the last 32 years. Exhibit BSG-1, p. 31. The balance of the design winter EDDs, before and after the cold snap, are 8-10 percent above (i.e., colder than) the normal EDDs. Id. Thus, the Company's design winter analysis provides a valid test of the resource portfolio under cold snap conditions. Id., pp. 31-32.

4. Base Case Forecast

a. Econometric Models

Econometric models were developed for the five-year period November through October of 1998/99 through 2002/03. The total throughput was forecast for each of the three operating divisions and for each rate class. The Company detailed its econometric models on Exhibit BSG-1, pp. 16-17. The results of the econometric models are presented on Schedule BSG-III-2.

b. Time Series Models

In order to improve the overall forecasting methodology and results used in D.P.U. 93-129, Bay State incorporated time series analysis into its demand forecasting methodology. Exhibit BSG-1, pp. 17-19. The purpose of time series analysis is to capture the historical trends in Company data over the years within each division and rate class, and in particular to capture recent trends which may not be weighed heavily in an econometric analysis that uses many years of historical data. Id. The time series models are described more fully on pages 17-19 of Exhibit BSG-1, and the results of the time series models are presented in Schedule BSG III-3.

c. Integration of Econometric and Time-Series Methodologies

Bay State integrated forecasts from its econometric and time series methods to improve the quality of the forecast results and to minimize the risk of potential error from any one method. Forecast growth rates were applied to the most recent year of actual data to calibrate the forecast to actual historical data. Exhibit BSG-1, p. 19; D.T.E.-RR-1. Tying a growth rate to actual values assures that the starting point for the forecast reflects existing levels of consumption and meters. D.T.E.-RR-1, p. 1.

For most customer classes, the results of the two forecasting methods were averaged equally. By averaging the results of the two methods, Bay State relies less on the econometric forecast, which is important in instances where, for example, data was limited by a small number of customers in a class and the R-square statistic was low. Tr. 1, pp. 39-40 (Dziura). The process by which Bay State averaged the results of the two forecasts is described in more detail in D.T.E.-RR-1. In a small number of cases, where it was apparent that one of the approaches was superior based on an examination of the reasonableness of the resulting forecast, only that one approach was used. Exhibit BSG-1, pp. 19-20.[(5)]

5. Demand Side Management

In the F&SP presented herein, Bay State did not explicitly reduce the Base and High Throughput Cases as a result of DSM implementation. DSM savings are captured in the Company's historic data and therefore DSM savings are reflected in the throughput forecast which is derived from this historical data. In addition, the Company added DSM impacts in the Low Migration Sensitivity. Exhibit BSG-1, p. 21.

6. Forecast Results

A summary of the annual forecast results for each division is presented in Schedule BSG-III-4. Detailed winter, summer and annual forecasts of throughput, by division and customer class, are presented in Schedule BSG-III-5, BSG-III-6, and BSG-III-7, for Base Case, High Case, and Low Case. The meter forecasts for winter and summer are presented in Schedules BSG-III-8, BSG-III-9 and BSG-III-10.

The Company's Base Case forecast over the five-year period 1998 through 2003 estimated an increase in throughput of approximately 2.5 percent per year. Exhibit BSG-1, p. 24 and Table III-1. This level of growth is comparable to Bay State's normalized throughput growth from 1993 to 1998.[(6)] Id.; Schedules BSG-III-11, BSG-III-12 and BSG-III-13. Base Case meters are forecast to increase by approximately 2.4 percent per year. Exhibit BSG-1, p. 24 and Table III-1.

Low case meters and throughput are forecast to grow at a similar annual rate on average as the base case (2.3 to 2.5 percent). In the High Case, growth in throughput is forecast at 4.2 percent, and growth in meters at 3.1 percent. Explanations concerning the differences in results between the Base, High and Low Cases are contained in Exhibit BSG-1, pp. 24-25 and related schedules referenced therein.

C. <u>Bay State Provided the Sendout Forecast Information Required From D.P.U. 93-129</u>

In D.P.U. 93-129, the Department's Order approving Bay State's last F&SP, the Department required the Company to provide information on six topics, one of which pertains to the sendout forecast:

1) show (a) how Bay State transforms quarterly forecasts into daily estimates (e.g., the process, the model, and the relevant variables), and (b) how closely the resulting estimates of daily sendout fit a representative sample of actual sendout during a historic period of time.

Order, D.P.U. 93-129, p. 52.

1. Transformation of Quarterly Throughput Forecasts <u>into Daily Sendout Estimates</u>

Bay State provided a detailed analysis showing the requested method. Exhibit BSG-1, pp. 25-29. Forecasts of quarterly firm throughput, by division and by rate class, are the direct outputs of Bay State's demand models. The quarterly throughput forecasts are converted to monthly sendout volumes (throughput plus unaccounted-for gas) and then into base load and heating increments by applying the ratios of historical relationships and the resulting estimation of base load and temperature-sensitive load. Exhibit BSG-1, pp. 26-28. The base load and heating increments are then used to create the forecast of daily sendout by division.

2. Comparison and Fit of Estimated Daily Sendouts to <u>Actual Sendouts</u>

Bay State compared the estimates of daily sendout to actual sendout by division, using actual daily firm sendout data and actual EDDs for November 1, 1996 through October 31, 1998 and monthly base load and heating increments from the summer 1996 CGA forecast. The heating increments are multiplied by the actual EDDs and the result is added to the base load estimate. Exhibit BSG-1, p. 29. Schedule BSG-III-14 presents the results of the analysis. It shows that the median values of daily differences between forecast and actual sendout are small when comparing annual, seasonal and weekday/weekend differences. Accordingly, the forecast of daily loads fits the actual load data quite well. Exhibit BSG-1, p. 29.

With this analysis, Bay State has demonstrated how it transforms quarterly forecasts into daily estimates and how closely the resulting estimates of daily sendout fit a representative sample of actual sendout during a historical period of time, as required in D.P.U. 93-129.

D. Methodology by Which Bay State Incorporated the Demand Forecast into the SENDOUT Model

For the Base, High and Low throughput cases, a daily demand forecast is calculated for both normal and design weather conditions using the base and temperature-sensitive heating load factors. To arrive at daily requirements, the daily EDDs for every day are multiplied by the monthly heating increment and added to base load. Monthly projections for interruptible and off-system sales are also incorporated into the model. The completed demand forecast is input into the SENDOUT model, which Bay State uses to select an optimal resource portfolio. This process is described in more detail in the Exhibit BSG-1, pp. 32-33.

E. Bay State's Sendout Forecast Should Be Approved Because it Complies with the Statutory Standard, and Bay State Has Supplied the Specific Information Required by the Department

Bay State's methodology for developing its F&SP is reviewable, appropriate and reliable in accordance with the Department's standards for approving forecasts and supply plans. The Company's detailed filing fully explains its data and the component steps it used in producing its forecast. Bay Sate presented extensive materials documenting the method by which it forecast sendout. Additionally, in accordance with the Department's directive in D.P.U. 93-129, the Company specifically produced more detailed information on how it transforms quarterly forecasts into daily estimates (the process, the model, and the relevant variables). The results of the forecasts, and the supporting information, were provided in schedules filed in this docket. The Company's witnesses submitted text and schedules, testified at the hearing in detail as to their techniques and results, and were cross-examined by the Department. Each responded to numerous data requests. Based on all of information provided by the Company, the Department should find that Bay State's filing contains enough information to allow a full understanding of the forecast methodology.

The Company's methodology is appropriate because the Company demonstrated that the methodology is technically suitable to the size and nature of Bay State. In this proceeding, Bay State presented a comprehensive sendout forecast that was founded on the same method that produced the forecast that the Department approved in D.P.U. 93-129. Bay State enhanced that methodology by, among other things, increasing the number of cases and sensitivities run, and by incorporating time series modeling where useful with its econometric modeling. Therefore, the Department should find that the methodology is technically suitable, appropriate and accurately projects the gas sendout requirements of the Company's market area.

Bay State's forecast reflects accurate and complete historical data, as well as reasonable statistical projection methods, which provide a sound basis for resource planning decisions. The Company demonstrated that its methodology provides a measure of confidence that its assumptions, judgments, and data will forecast what it most likely to occur. In response to the Department's directive in D.P.U. 93-129, Bay State compared the estimated daily sendouts to actual sendouts to demonstrate that the forecast of daily loads fits the actual load data quite well. Additionally, the Company's last forecast, which relied on a substantially similar methodology as the current forecast but lacked the enhancements presented herein, proved accurate and reasonable except for the effects of the recessions in the early 1990's on growth which depressed demand for a few years. As the Company demonstrated, its forecast used reasonable statistical methods based on sound historical data, and the forecast is reliable.

III. <u>BAY STATE'S SUPPLY PLAN IS ADEQUATE TO MEET FORECASTED REQUIREMENTS, APPROPRIATELY BALANCES COST AND RELIABILITY CONSIDERATIONS AND, THEREFORE, SHOULD BE APPROVED</u>

A. <u>Bay State Supply Plan Is Adequate To Meet Projected Normal, Design Day, Design Year And Cold Snap Sendout Requirements</u>

1. <u>Introduction</u>

In fulfilling its statutory responsibility to ensure "a necessary energy supply for the commonwealth with a minimum impact on the environment at the lowest possible cost", the Department evaluates an LDC's supply plan for adequacy and cost, and evaluates an

LDC's supply planning process. Essex County Gas Company, D.P.U. 93-95, p. 21 (1996). More specifically, the Department reviews a supply plan to determine whether it is adequate to meet projected normal, design day, design year and cold snap sendout requirements. Id. at 22. If the supply plan does not include an identified set of resources to meet projected sendout, then an LDC must demonstrate that it has an action plan that will allow it to meet projected sendout if the identified resources are not available. Id.

In this proceeding, Bay State projected sendout under normal and design (including cold snap) conditions and has presented an identified set of resources to meet the projected demand. Under all cases and sensitivity analyses, the Company projects to have an adequate set of identified resources to meet its sendout requirements in a best cost fashion using a combination of pipeline delivered supplies, including underground storage, and on-system peaking resources.[(7)] Exhibit BSG-1, pp. 53-54.

The resources projected to be used under normal weather conditions over the five year forecast period are set forth on Schedule BSG-V-16, pp. 19-22.[(8)] Bay State presented resource plans for design conditions under a number of scenarios. In all analyses, Bay State assumed that it would be responsible for meeting 75% of its transportation customers' capacity requirements. Exhibit BSG-1, p. 43. Subsequent to Bay State's filing in this case, the Department adopted a mandatory capacity assignment program requiring LDCs to remain responsible for meeting the requirements of existing firm sales customers as of February 1, 1999 for a five year transition period. D.T.E. 98-32-B, pp. 35, 58-59 (as amended by a Settlement Agreement approved on April 2, 1999 in D.T.E. 98-32). The mandatory assignment situation is approximated by Bay State's High Throughput/Low Migration Sensitivity analysis. Tr. 1, p. 67 (DaFonte). Bay State demonstrated that it had an identified set of resources to meet demand under these assumptions. Thus, Bay State's F&SP remains valid even after D.T.E. Order 98-32-B.

2. Design Day

Design Day resources were presented three ways. Base Case Design Day resources are shown on Exhibit BSG-1, Schedule V-3. High Case Design Day is presented on Schedule V-6. The resources used under Design Day Low Throughput conditions are set forth on Schedule V-9. In each of these design day analyses, the Company identified adequate resources to meet projected demand.[(9)]

3. Design Year

Resources used to meet Design Year sendout were presented under five alternative forecasts. Design Year resources under the Base Case are summarized on Schedule BSG-V-4. Bay State's Design Year High Case resource portfolio is summarized on Schedule BSG-V-7, and its Design Year Low Case portfolio is summarized on Schedule BSG-V-10.

In addition, Bay Sate analyzed Design Year Low and High Migration Sensitivities to reflect the uncertainty inherent in unbundling, especially in the residential sector. The

Low Migration Sensitivity portfolio, which is a variation of the High Throughput Case is set forth on Schedule BSG-V-14. The High Migration Sensitivity is a variation of the Low Throughput Case. The resources identified in this analysis are summarized on Schedule BSG-V-14. In each of these Design Year analyses, the Company has identified adequate resources to meet customer demand.

4. Cold Snap

As indicated above, the Design Year analyses includes a Cold Snap. Because Bay State has identified adequate resources to meet projected sendout under all design conditions examined, it has done so for a Cold Snap as well.

B. Bay State's Supply Planning Process Produces a Best Cost Portfolio

1. Resource Planning Process

The Department analyzes an LDC's supply planing process to determine whether the process enables the LDC to identify and evaluate a full range of supply options and compare all options, including DSM, on an equal footing. Essex County Gas Company, D.P.U. 93-95, pp. 22-23 (1996). In this case, Bay State has demonstrated that it considers a wide range of options in assembling its resource portfolio. Bay State noted that it maintains continuous contact with suppliers, pipelines and other service providers. In addition, it reviews trade press and marketing materials relative to new resource projects serving New England. Its existing portfolio, which consists of over 50 upstream pipeline and storage contracts from both domestic and Canadian resources, together with 13 local storage and production facilities, is evidence that Bay State identifies and evaluates a wide range of resources in its planning efforts. Exhibit BSG-1, pp. 35, 53-54.

Bay State subjects its major supply and transportation options to rigorous analysis comparing the cost and non-cost criteria of each resource on a consistent basis. Exhibit BSG-1, pp. 35-37. Specifically, resource costs are compared using the SENDOUT model, which analyzes identified resources and determines the optimal mix of resources to meet projected demand at the least cost. By using this approach, each resource is judged by its cost impact on the Company's overall portfolio, allowing for consistent or "apples to apples" comparisons. Id. at 35-36.

In addition, resources are screened using three non-cost criteria, security/reliability, flexibility and viability. Security/reliability, the most critical of these factors, refers to the degree of assurance a resource will be available for utilization when needed. Flexibility, another critical factor, refers to the ability of a resource to respond to changing demand conditions. Viability refers to the strength of the entity offering the service. Id. at 35-37. As indicated, Bay State consistently applies these qualitative factors when comparing various transportation and supply resources. Id. at 36.

Bay State indicated that, in the future, it plans to involve marketers and other stakeholders in capacity planning decisions. Tr. 1, pp. 114-115 (DaFonte). This is consistent with Department Order D.T.E. 98-32-B. D.T.E. 98-32-B, Order, p. 41; Tr. 1, p. 75 (DaFonte).

Demand Side Management resources play an important role in Bay State's ability to meet projected sendout. Bay State has provided DSM installations to all customer classes since 1993, pursuant to Department approval. Bay State Gas Company, D.P.U. 91-272 (1992). All Bay State's DSM resources are screened for cost-effectiveness on the basis of avoided costs, which are computed using the cost of alternative transportation and supply options. Cost-effective DSM measures are implemented aggressively, as approved by the Department from time to time, but implementation is managed to avoid significant adverse rate impacts resulting from the recovery of DSM implementation costs. In this case, Bay State has been implementing DSM over the latter portion of the historical period on which the forecasting data was accumulated (1983-1998). Exhibit BSG-1, pp. 21-22. No increase in DSM implementation levels is projected at this time. Therefore, a base line level of DSM is reflected in the sendout forecast, and no adjustment was needed to reflect future DSM efforts in the base case forecast. In Bay State's Low Throughput Case, increased DSM activity was assumed to account for the possibility that DSM activity may increase compared to past experience. Id. at 22.

Because DSM resources are screened on the basis of avoided costs, including avoided supply costs as determined by the SENDOUT Model, and are implemented aggressively pursuant to specific Department approval, Bay State believes that DSM resources have been appropriately considered in its F&SP.

2. Recent Resource Additions

The Department assesses an LDC's resource planning process by examining whether the process has resulted in least cost additions to the resource plan. Essex County Gas Company, D.P.U. 93-95, p. 23, (1996). In this case, Bay State presented two significant resource additions since the last supply plan reviewed by the Department which demonstrate how Bay State uses its resource planning process to produce a best cost portfolio. These resources are transportation capacity on Portland Natural Gas Transmission System ("PNGTS") and a release of Tennessee Pipeline capacity to the Berkshire Power Project in exchange for a winter peaking service.

a) PNGTS

i) 1995 Decision

On June 2, 1995, Bay State entered into a Precedent Agreement with PNGTS for 40,600 MMBtu/day of winter transportation capacity and 4,900 MMBtu/day of year-round transportation capacity on PNGTS. Exhibit BSG-1, p. 57. Volumes have begun flowing on PNGTS to Bay State. In this proceeding, Bay State presented the decision making process it used to acquire the PNGTS resource, as well as the more recent analyses it employed to confirm that PNGTS continues to represent a best cost addition to its portfolio.

In 1995, Bay State identified a need for incremental pipeline capacity to meet forecasted demand and analyzed resource additions using the Sage 2000 resource optimization model.[(10)] The Sage 2000 model was used to determine the least cost mix of resources required to meet total firm requirements over the planing horizon, taking into account the fixed and variable cost of each resource option. Exhibit D.T.E.-1-16, p. 2. PNGTS was evaluated against six other viable resources available at the time. All alternatives involved expansions on the Tennessee, Iroquois or Algonquin gas pipelines. On the basis of cost, the Sage 2000 model selected the PNGTS resource in the quantities for which Bay State eventually contracted, as a least cost option. Exhibit D.T.E.-1-16, Attachment A, p. 1.

Bay State also considered non-cost factors in its decision to contract for PNGTS capacity. Concerning security/reliability (one element of which is diversity) Bay State noted that the PNGTS volumes would be Canadian based. The PNGTS volumes were to replace Canadian supplies being transported over the Portland Pipe Line and thus, a degree of supply basin diversity would be retained. Exhibit D.T.E.-1-16, p. 3. Similarly, before contracting for service on PNGTS, Bay State assessed the viability of PNGTS versus other incremental projects, considering Bay State's projected need date of winter 1998/99. Id. PNGTS scored as high as all other projects in terms of viability. Id.

Based on the cost, reliability and viability of PNGTS relative to other alternatives at that time, Bay State opted to contract for service on PNGTS to meet the identified need. Bay State's resource selection process was comprehensive, considering cost and non-cost factors. Therefore, the acquisition of the PNGTS capacity was prudent. D.T.E.-RR-4.

ii) 1998 Confirmation

In this proceeding, Bay State presented recent analyses which confirm that PNGTS continues to be a least cost addition to Bay State's resource portfolio. Exhibit BSG-1, p. 60. Bay State performed SENDOUT model runs where any resource that was due to expire over the next five years, with the exception of PNGTS, could be selected in any quantity.[(11)] These resources are listed in Exhibit BSG-1, p. 61. The SENDOUT model was permitted to select any level of PNGTS, up to the contracted levels, to verify its continued place in a least cost resource portfolio.

Consistent with the sendout forecasts described above, several scenarios were run. The Design Year Base Throughput Case results, shown on Exhibit BSG-1, p. 63 (Table V-3) indicate that the SENDOUT model selected the currently contracted levels of PNGTS, thus confirming Bay State's selection of that resource as a least cost resource. Similarly, the full contract volumes of PNGTS were selected under the High and Low Throughput Cases. Exhibit BSG-1, p. 64 (Table V-4) and p. 65 (Table V-5).

High and Low Migration Sensitivity Cases were also run. PNGTS was selected at the contracted levels under the Low, but not the High, Migration Sensitivity Cases.[(12)] Exhibit BSG-1, p. 66 (Table V-6). However, Bay State believes that the High Migration Sensitivity Case is less likely in view of the Department's current mandatory assignment policy. Moreover, the impact of high migration would be off set because, as a result of D.T.E. 98-32-B and the subsequent approval of a Settlement Agreement in D.T.E. 98-32 on April 2, 1999, Bay State is required to plan for the capacity requirements of all existing firm sales customers as of February 1, 1999.

These analyses confirm that capacity on PNGTS continues to represent a least cost addition to the portfolio today as PNGTS is put in service. In addition, should circumstances change, Bay State has certain decontracting rights, allowing it to reduce its contracted volumes on PNGTS if the pipeline meets its cost of service and there are replacement shippers. Tr. 1, p. 80 (Dexter).

iii) Bay State's PNGTS Capacity is Assignable Pursuant to D.T.E. 98-32-B

The PNGTS contracts were entered into in order to satisfy Bay State's continuing obligations to plan for and enter into long-term supply and capacity contracts necessary to ensure that its customers have a reliable source of gas supply on every day, consistent with applicable statutory and regulatory requirements.

In D.T.E. 98-32-B, the Department cited two objectives with respect to capacity assignment: 1) to ensure reliable service; and, 2) to avoid cost shifting between sales customers and transportation customers. D.T.E. 98-32-B, Order at 25-26 and 29. To meet these two objectives, the Department adopted a mandatory, slice of system, assignment policy. Id. at 35. This approach, the Department noted, "will allocate capacity costs to all customers on an equitable basis." Id. at 34. "Under the 'slice of system' approach customers receive their pro rata share of each capacity contract. As a result migrating and remaining customers assume identical capacity costs." Id. at n. 19. (emphasis added). Nowhere in D.T.E. 98-32-B does the Department state or suggest, that any particular piece of committed capacity would be excluded from this assignment. To the contrary, the Order states that each contract for capacity should be assigned. The Company's PNGTS capacity, like all of Bay State's other resources, was acquired to provide best cost service to its customers.

While the commitment to PNGTS had been made well in advance of the proceedings in D.T.E. 98-32, Bay State fully disclosed its intentions to include this important resource in the capacity disposition mechanism established by the Department. Moreover, the benefits of PNGTS capacity to the region were recognized during the hearings in D.T.E. 98-32. The Competitive Marketers cited PNGTS as a resource that would add "even further physical deliverability into Massachusetts" in their response to D.T.E. Record Request No. 3, p. 1 in that proceeding. Thus, the Competitive Marketers are not only aware of the PNGTS capacity coming on-line, but recognize its importance to the issue of reliability in an unbundled environment.

Since 1995, PNGTS has been a committed resource in Bay State's portfolio needed to satisfy Bay State's current and future obligation to provide capacity for its customers in a best cost manner. The PNGTS capacity should be assigned in accordance with D.T.E. 98-32-B, consistent with all other resources that were acquired prior to the Order. D.T.E.-RR-4

b) <u>Capacity Release to the Berkshire Power Project</u>

Because of the availability of PNGTS capacity, Bay State was able to arrange a release of a significant portion of its Tennessee longhaul capacity to Berkshire Power, a developing electric power plant in Bay State's service territory. Under this capacity release arrangement, Bay State will be able to reduce its year-round transportation commitment with Tennessee for the remainder of its term and secure a low cost firm peaking supply. Specifically, Bay State will be able to release 45,000 MMBtu/day of longhaul capacity on Tennessee Gas Pipeline at maximum rates through October 31, 2000 while receiving the right to call on that capacity and supply for 720 hours/year during peak times, with no minimum daily or annual take requirements and flexible intraday nomination rights. If called on, Bay State will pay Berkshire Power a price based on No. 2 fuel oil, Berkshire's replacement fuel. Bay State will receive maximum rates for the capacity transferred. Thus, the Company obtains this extremely flexible peaking supply without paying any demand charges. Exhibit BSG-1, p. 59; Tr. 1, pp. 51-52 (DaFonte).

In addition, after October 2000, under the terms of the capacity release, Berkshire Power must offer Bay State the peaking service for as long as it holds the Tennessee capacity. If Berkshire Power does not extend the Tennessee capacity beyond 2000, or defaults on the capacity, Bay State has the right to re-acquire the Tennessee capacity at maximum rates. <u>Id.</u>

This arrangement exemplifies Bay State's efforts to manage its resource portfolio in a best cost fashion. In 1999, once the capacity release to Berkshire Power is reflected in the SENDOUT Model, the remaining Tennessee longhaul capacity is selected for inclusion in the best cost portfolio at nearly 100% of the remaining contracted level. For Bay State's Base Case Design Year, 65% of Tennessee longhaul capacity is selected in 1998 while 92% is selected in 1999, after the release to Berkshire Power. Exhibit BSG-1, p. 63, Table V-3. Similarly, in the High Case, 78% of Tennessee longhaul capacity is selected in 1998 while 98% is selected in 1999. <u>Id.</u> at 64, Table V-4. Finally, in the Low Case, 67% of Tennessee longhaul capacity is selected in 1998 while 92% is selected in 1999. Id. at 65, Table V-5.

C. Conclusion on Supply Plan

In this proceeding, Bay State has presented a supply plan that identifies a wide range of resources to meet projected demand under normal, Design Day, Design Year and Cold Snap conditions. In addition, Bay State has presented a resource planning process that identifies a full range of resource options, including DSM, and compares these options on an equal basis, using sophisticated modeling techniques to evaluate the cost of competing options. Non-cost criteria are evaluated outside of the least cost model. Further, Bay State demonstrated that it uses this process to secure best cost resource additions such as PNGTS capacity, a capacity release/peaking supply arrangement with Berkshire Power and DSM. Thus, Bay State has satisfied the Department's standard for resource plans and, accordingly, the Department should approve Bay State's plan.

D. Supply Plan Information Required from D.P.U. 93-129

In its Order in D.P.U. 93-129, page 6, the Department indicated that in Bay State's next F&SP, it must submit several pieces of information related to Bay State's Supply Plan. The information sought, and a summary of Bay State's response follows:

Information Request No. 2:[13]

(a) Provide a clear description of the maximum resource capability available to serve each division, (b) differentiate between firm and non-firm arrangements, and (c) discuss any supply-related risks if the resources on which it relies are not firm.

Bay State's Response No. 2:

The Company provided its maximum capabilities, as compared to projected takes, on a seasonal and design day basis over the forecast period. Exhibit D.T.E.-1-29(a) Supplemental. All resources indicated are firm except for relatively small amounts of deliveries out of CNG Storage that use interruptible transportation capacity on pipelines. This interruptible transportation is not relied on in the Design Day scenario. Exhibit BSG-1, p. 54.

Information Request No. 3:

Document Bay State's efforts to compare all resources on an equal basis.

Bay State's Response No. 3:

This information is provided in Exhibit BSG-1, pp. 21-22. Bay State included DSM in its demand forecast rather than as a separate supply resource. Since the Order in D.P.U. 93-129 was issued, Bay State has undergone significant changes in response to an evolving energy marketplace, including extensive unbundling of its sales service. Bay State continues to utilize the avoided costs of its supply resources to assess the cost-effectiveness of its DSM resources, ensuring that they are compared on an equal basis. This approach is reasonable and consistent with the intent of Request No. 3.

Further, Bay State's supply planning process includes the use of its SENDOUT model to compare the cost of various supply resources. As discussed Bay State evaluates all supply options on the basis of several non-cost criteria, supply security/reliability, supply flexibility and supplier viability. Id., pp. 34-37.

Information Request No. 4:

Detail the costs and benefits of integration between Bay State and Northern, including a cost/benefit analysis with respect to the services provided by Granite State.

Bay State's Response No. 4:

Bay State's supply plan is presented on a stand alone basis, i.e. independent of Northern Utilities, Inc. Exhibit D.T.E.-1-14. Each company maintains a separate resource portfolio. However, the two companies systems are operated in an integrated fashion.

There are three basic benefits of integrated operations. First, through the Operational Balancing Agreement, the companies have greater flexibility on a daily basis for nominations and imbalance management than they would if the services were not provided on an integrated basis. Exhibit BSG-1, pp. 45-46. Second, Bay State has obtained low cost Canadian gas supplies via the Portland Pipe Line and has avoided incremental shorthaul transportation costs on Tennessee Gas Pipeline by displacing its flowing supply on Granite. Id. at 46. Third, each company experiences administration costs saving associated with gas supply activities as a result of integration. Id.

Information Request No. 5:

Assess current market risks when analyzing capacity decisions, including demand and supply-side risks and the risk of uncertainty associated with long-term decision-making.

Bay State's Response No. 5:

Bay State provided a complete discussion of the various risks and how it has protected against the risks. Exhibit BSG-1, pp. 38-40. These actions include performing high and low migration sensitivity analyses, conducting an unbundling pilot program, monitoring the electric power market, releasing capacity to the Berkshire Power Project, and diversify its supply sources by introducing Mid-West storage gas using its PNGTS capacity.

Information Request No. 6:

Demonstrate what steps it has taken to manage proactively its resource portfolio to ensure that it is least-cost.

Bay State's Response No. 6:

Bay State proactively manages its resource portfolio to ensure that it is best cost. The Company uses bundled sales and exchanges, capacity releases and interruptible sales, resulting in a credit to the CGA of $10 million over the past three years. Id. at 47. In addition, Bay State entered into an agreement with the Berkshire Power Project for the permanent release of Tennessee capacity to Berkshire and acquired a low cost peaking supply in exchange. See Section III(B)(2)(b), supra.

IV. CONCLUSION

WHEREFORE, for the reasons stated hereinabove, Bay State Gas Company respectfully requests that the Department approve Bay State's Forecast and Supply Plan, as presented in this proceeding.

Respectfully submitted,

BAY STATE GAS COMPANY

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DATED: May 13, 1999

BS2 62948

CERTIFICATE OF SERVICE

In accordance with 220 C.M.R. 1.11(6), I hereby certify that a copy of the within document was served, by hand delivery, on all persons listed on the attached Service List for D.T.E. 98-86.

____

Susan L. Geiser

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1. For purposes of this Initial Brief, Bay State uses the terms sendout, demand and throughput interchangeably, unless noted otherwise.

2. In total, Bay State developed almost 100 models, with hundreds of parameter estimates in preparing its F&SP. Exhibit BSG-1, p. 14.

3. In Bay State's most recent F&SP filing, the Department approved the Company's use of High and Low Cases to create a range around the Base Case. D.P.U. 93-129, pp. 23-24.

4. The use of service territory specific economic data is an enhancement over the forecast presented in D.T.E. 93-129 wherein Bay State used county level economic data. D.P.U. 93-129, p. 16. Note, however, that Standard & Poor DRI's forecasted energy prices are not service territory specific.

5. The Company specified the divisions and customer classes for which it used only one approach. Exhibit BSG-1, pp. 19-20.

6. The 1992/93 forecast and the 1993/94 forecast over-estimated demand due the effects of the recession in the early 1990's on growth. Because significantly less load was added during the recession, large differences between actual and forecast demand began to develop. However, the gap between actual and forecast did not widen in later years, demonstrating that the forecast trend resumed. D.T.E.-RR-2.

7. Consistent with past forecasts, Bay State uses the term "best cost" rather than "least cost" in describing its optimal portfolio. In developing a best cost portfolio, Bay State recognizes that cost and non-cost parameters such as flexibility and reliability must be considered also. A least cost portfolio (strictly speaking) is not optimal if it is not adequately reliable. Exhibit D.T.E.-1-1; See Bay State Gas Company, E.F.S.C. 88-13, p. 36, (1989).

8. For all analyses of resources projected to be used under design conditions, as described below, the Company provided a table summarizing the model output results. See, e.g., Schedule BSG-V-4, for Design Year Base Case.

9. As indicated earlier, the High Case differs from the Base Case in that the High Case reflects more optimistic economic and demographic variables and assumes increased load from new projects. Exhibit BSG-1, p. 20. The Low Case reflects more pessimistic economic variables and reflects increased DSM activity. Id.

10. The Sage 2000 model was known as the Gas Resource Optimization Model, or GROM Model, when the Department approved Bay State's supply plan, and endorsed the use of the GROM Model, in D.P.U. 93-129, p. 43.

11. Such analyses are used, and will continue to be used, to help Bay State select resources as significant pipeline transportation contracts come due for renewal over the next five years or as market conditions change.

12. Only two storage options, including the storage component of PNGTS, were fully utilized in the High Migration Sensitivity Case.

13. The number of the request coincides with the number assigned in D.P.U. 93-129, p. 52.